REMARKS / ARGUMENTS

Examiner Do is thanked for the thorough examination of the subject Patent Application. The claims have been carefully reviewed and amended, and are considered to be in condition for allowance.

It is the objective of this invention to provide a multichannel digital filter bank circuit and a method implemented by cascading sub-filters of the recursive type suitable for graphically equalizing electrical signals received via a communication path. It is also an objective of this invention to produced equalized signals having minimal distortion of signal spectral characteristics including magnitude and phase. The circuit of this invention is implemented with cascaded connections of first order or second order digital filters. It is an additional objective of this invention to provide for the programming of the individual transfer functions of the above digital filters so as to produce unity gain. This unity gain case results in an output signal which is an exact replica of the input signal with no delay. This result indicates the minimal distortion introduced by the method of this invention.

Reconsideration of the objection to claim 3, because of informalities, is requested based on the following.

Claim 3 has been corrected by adding a period at the end of the claim.

Reconsideration of the rejection of claims 1-6, under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention, is requested based on the following.

Independent claims 1 and 4 have been amended to clearly state that the electrical signals are enhanced, attenuated, or kept the same as the filter electrical signals after passing through the cascaded filters. Dependent claims 2, 3, 5 and 6 should now be allowed due to their dependence on the amended claims 1 and 4.

Reconsideration of the rejection of claims 1 and 4, under 35 U.S.C. 102(e) as being anticipated by Tan et al. (US Patent 6,233,594), is requested based on the following.

Tan et al., which is not a graphics equalizer, uses fixed low pass filter sections which block high frequencies. The instant application, which is a graphics equalizer, uses bandpass filter sections with programmable parameters which allow users to shape the frequency spectrum as required. Also, Tan et al. involves filters with multiple sampling frequencies. In Tan, the second sampling frequency is less than the first sampling frequency. Similarly, the third sampling frequency is less than the second sampling frequency. Filters such as Tan which have reduced sampling frequency between consecutive sections are known as decimation filters. The filter described in Tan et al. is more complex than the instant application, as is shown in claim 1 as amended below where it is stated that the instant application does not require multiple sampling

frequencies. In addition, the simplicity of the first order and second order filters in the instant application allows filtering without additional delay of the inbound signal as stated in claim 1 above. Tan et al. does not state explicitly that there is no additional delay of the inbound signal. Also, the amended claim 1 below states that there is no additional delay of the inbound signal.

A multichannel digital filter bank comprising:

a plurality of first order or second order digital filters, connected in a cascade fashion, whereby said electrical signals are enhanced, attenuated or kept the same, after passing through said cascading sub-filters, wherein said first order or second order digital filters are of the recursive type suitable for graphically equalizing electrical signals received via a communication path, wherein said first or second order digital filters have minimal distortion of signal spectral characteristics including magnitude and phase, wherein said first order or second order digital filters do not introduce additional delay of said electrical signals received via said communication path, and wherein said first or second order digital filters do not require multiple sampling frequencies.

In the Response to Arguments section of the current office action, the examiner states that the previous amendment to claim 1 which explains that the instant application which has 1) the feature that filtering occurs without additional delay of the inbound signal and 2) the feature of not requiring multiple sampling frequencies carries no patentable weight, since it is in the preamble. Claim 1 of the instant application has been further amended to move the 2 limitations concerning no additional delay of the inbound signal and not requiring multiple sampling frequencies to the element section of claim 1, as shown in the amended claim 1 above.

In addition, for allowance of claim 4 of the instant application, claim 4 has also been further amended to move the 2 limitations concerning no additional delay of the inbound signal and not requiring multiple sampling frequencies from the preamble to the element section of claim 4, as shown in the amended claim 4 below.

A method for equalizing electrical signals, comprising the steps of:
filtering the electrical signals using first order or second order digital filtering, wherein said filters are cascade connected, whereby said electrical signals are enhanced, attenuated, or kept the same, after said step of filtering the electrical signals using first order or second order digital filtering, wherein said filters are cascade connected, wherein said first order or second order digital filtering are of the recursive type suitable for graphically equalizing electrical signals received via a communication path, wherein said first or second order digital filtering have minimal distortion of signal spectral characteristics including magnitude and phase, wherein said first or second order digital filtering do not introduce additional delay of said electrical signals received via said communication path, and wherein said first or second order digital filtering do not require multiple sampling frequencies.

Reconsideration of the rejection of claims 2 and 5, under 35 U.S.C. 102(b) as being anticipated by Dyer (US Patent 4,947,360), is requested based on the following.

Figures 1 and 2 of Dyer show stages of sub-filter of a recursive filter. Dyer includes three different types of filters. These include sub-filters, all-pass filter, and T-section filter. Each have unique transform equations. The design of Dyer is much more complex than the claimed invention. Dyer uses a crisscross network with feedback from the output of "block 25" (fig.2) to the input at "block 31" and a feed forward from the output of "block 11" to "block 33". The instant application uses a simple straight-line cascade connection of subsections without any crisscross wires. Also, Dyer, which is not a graphics equalizer, does not explicitly indicate that there is no additional delay of the inbound signal. The

instant application, as is shown in amended claims 1 and 4 above, illustrates the simpler implementation utilizing one type of sub-filter of the recursive type instead of the three types of filters used in Dyer, stressing no additional delay.

In the Response to Arguments section of the current office action, the examiner states that the previous amendment to claim 1 which explains that the instant application has the feature that filtering occurs without additional delay of the inbound signal carries no patentable weight, since it is in the preamble. Claims 1 and 4 of the instant application have been further amended to move the limitation concerning the use of first or second order digital filters of the recursive type with no additional delay of the inbound signal from the preamble to the element section of claims 1 and 4, as shown in the amended claims 1 and 4 above. Claims 2 and 5 should be allowed, since they depend on independent claims 1 and 4 respectively.

Reconsideration of the rejection of claims 3 and 6, under 35 U.S.C. 102(b) as being anticipated by Cox et al. (US Patent 5,353,346), is requested based on the following.

Cox et al. is primarily a signal classifier. Cox uses a series of notch filters to separate an inbound signal into separable components. Cox splits the input signal into two parallel paths (High-Band Isolation and Low-Band Isolation). The output of each of the parallel paths is further split into 3 parallel paths. Cox requires functional blocks such as high-band isolation filter, low-band isolation filter, block classifier, and timing classifier. Cox uses fixed frequency blocks, and is limited by the additive results of a few constant

amplitude sinusoidal components. Cox which is not a graphics equalizer does not teach the simple filtering techniques of the instant application. Cox does not explicitly state that there is no additional delay of the inbound signal. The instant application, as is shown in claim 1 as amended above, illustrates the simpler implementation utilizing one type of sub-filter of the recursive type instead of complex separation of the inbound signal using multiple notch filters used in Cox. Claims 1 and 4 of the instant application have been further amended to move the limitation concerning the use of first or second order digital filters of the recursive type with no additional delay of the inbound signal from the preamble to the element section of claims 1 and 4, as shown in the amended claims 1 and 4 above. Claims 3 and 6 should be allowed, since they depend on independent claims 1 and 4 respectively.

We have reviewed the related art references made of record and agree with the Examiner that none of these suggest the present claimed invention.

The examiner is thanked for the thorough review of this patent application. The changes to the specification do not introduce any new matter.

It is requested that should there be any problems with this Amendment, please call the undersigned Attorney at (845) 452-5863.

Respectfully submitted,

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